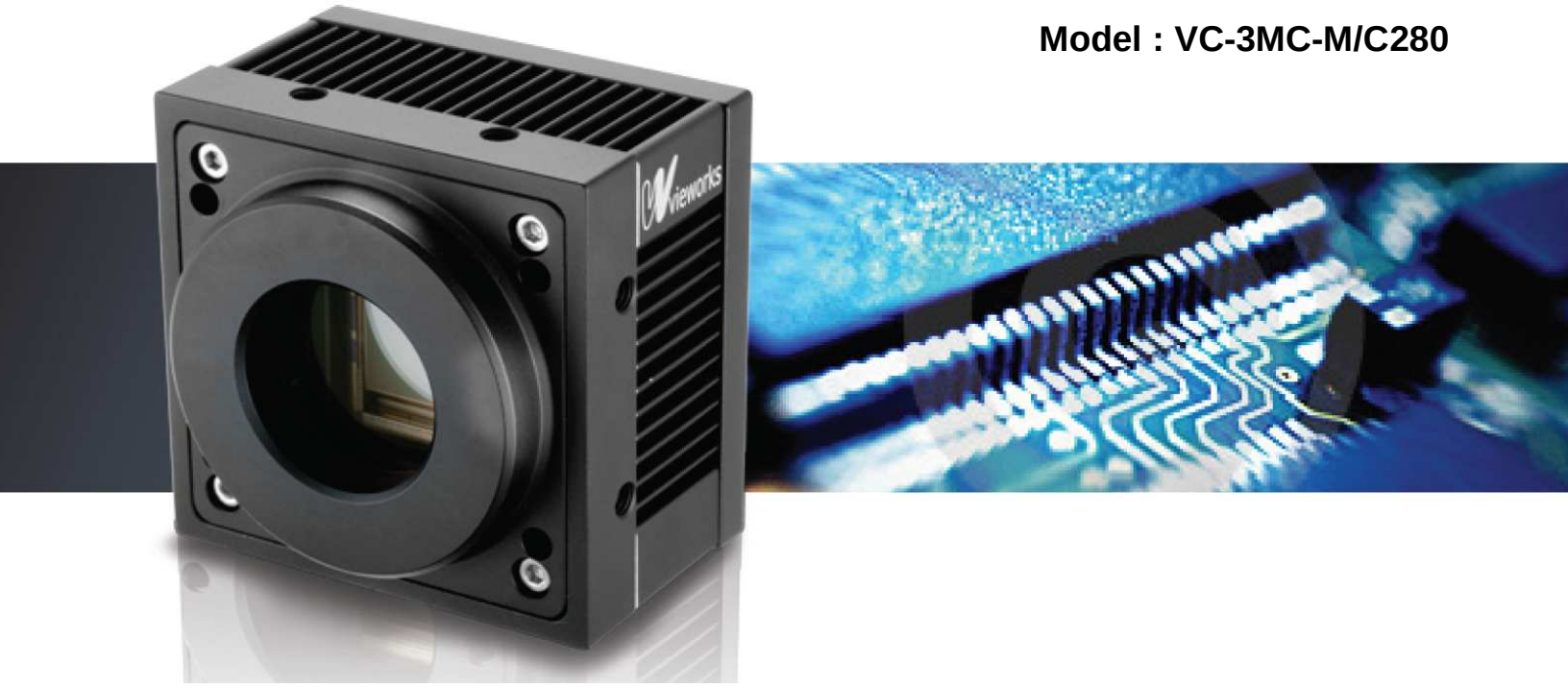
User Manual

ENGLISH

Model : VC-3MC-M/C280



vieworks
Industrial Cameras

Revision History

Revison	Date	Descriptions
1.0	2010/10/01	Initial release
1.1	2010/12/13	Insert the missing commands (”scl”,”gcl”). page 31
1.2	2011/01/03	New Manual Design

Contents

1. Precautions ----- 5
2. Compliance & Certifications ----- 5
2.1. FCC Declaration ----- 5
3. Package Contents ----- 6
Mount Plate (OPTION) ----- 6
CD 6
4. Installation ----- 7
PC Connection ----- 7
Camera (Camera Link Interface) ----- 7
Mount Plate 8
5. Overview ----- 9
5.1. Specifications ----- 10
5.2. Spectral Response ----- 11
5.3. Camera Interface ----- 11
Camera Link Connector ----- 12
Power Input Connector ----- 16
Control Connecter ----- 17
Trigger Input Circuit ----- 18
Strobe Output Circuit ----- 19
5.4. Mechanical Specification ----- 20
Mechanical Dimension ----- 20
6. Camera Features ----- 21
6.1. Area Of Interest (AOI) ----- 21
6.2. Trigger Mode ----- 22
FreeRun Mode ----- 22
External Sync Mode ----- 24
6.2.1.1. Overlap Trigger input ----- 25
6.3. Camera Link Output ----- 26
6.4. Gain and Offset ----- 27
6.5. Temperature Monitor ----- 28
6.6. Status LED ----- 28
6.7. Test Image ----- 29
6.8. Strobe Out ----- 30
Strobe out Polarity ----- 30

6.9. Field Upgrade ---------- 31
6.10. Dark Image Correction ---------- 31
7. Serial Communication ---------- 32
7.1. Setup command ---------- 32
Types of Error Code ---------- 33
7.2. Parameter Storage Space ---------- 34
Camera Setting Command List ---------- 35
Camera Configuration Command List ---------- 37
7.3. Configurator GUI ---------- 38
Camera Scan ---------- 38
Menu 39
7.3.1.1. File 39
7.3.1.2. Start-Up 40
7.3.1.3. Tool 41
7.3.1.4. Help 42
Tab 43
7.3.1.5. VIEW tab 43
7.3.1.6. MODE/EXP Tap ---------- 44
7.3.1.7. ANALOG Tab ---------- 45

1. Precautions

General

- Do not drop or damage the device.
- Do not disassemble, repair or alter the device.
- Do not let children touch the device without supervision.
- Do not use the device for any other purpose than specified.
- Contact your nearest distributor in case of trouble or problem.

Installation & Maintenance

- Do not install the device in a place subject to direct sun light, humidity, dust or soot.
- Do not place magnets near the product.
- Do not place the device next to heating equipments.
- Be careful not to let liquid like water, drinks or chemicals leak inside the device.
- Clean the device often to remove dust on it.
- In clearing, do not splash water on the device but wipe it out with smooth cloth or towel.

Power Supply

It is recommended the use of 12V DC with ±10% of voltage, over 1A of output current with KC, CE or other local certification. (※ Vieworks Co., Ltd. DO NOT provide power supplies with the devices.)

If voltage over 16V is supplied, it will cause damages to the device.

2. Compliance & Certifications

2.1. FCC Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expenses.

2.2. CE : DoC

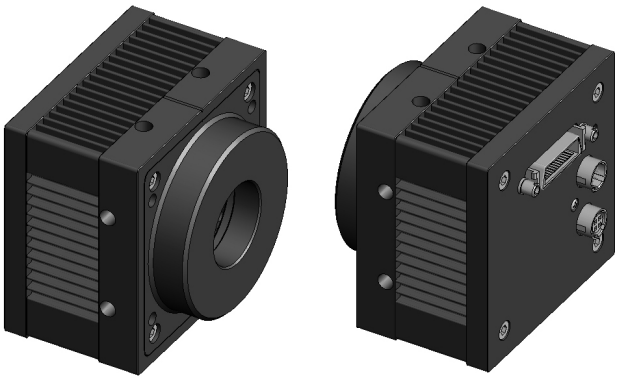
EMC Directive 2004/108/EC.

Testing Standard EN 55022:2006+A1:2007, EN 55024:1998+A1:2001+A2:2003

Class A

3. Package Contents

Camera (1 unit)

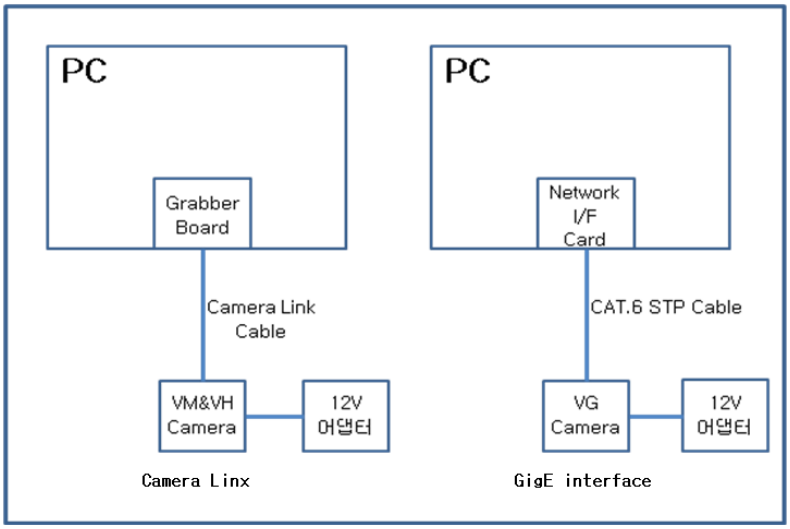


Mount Plate (OPTION)

CD

4. Installation

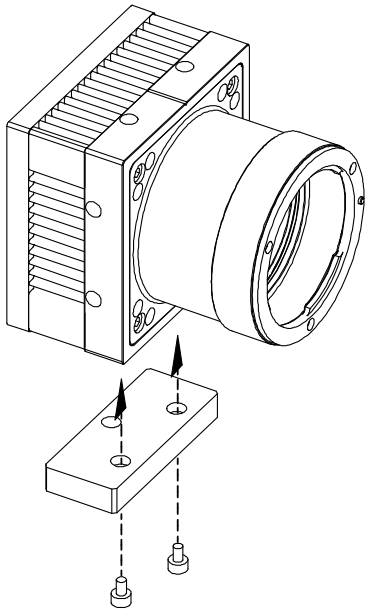
PC Connection



Camera (Camera Link Interface)

- Camera Link Cable Connection
- Power Cable Connection
- Control Cable Connection

Mount Plate



- The Mount Plate is provided as Option.
- The camera can be fix without using this Mount Plate.

5. Overview

VIEWORKS VC series is an industrial Area Scan Camera with high-speed frame using high resolution CMOS sensors.

With its high reliability and durability, this camera is suitable for machine vision requiring high-speed continuous shooting.

Following are the system block diagram and the main features.

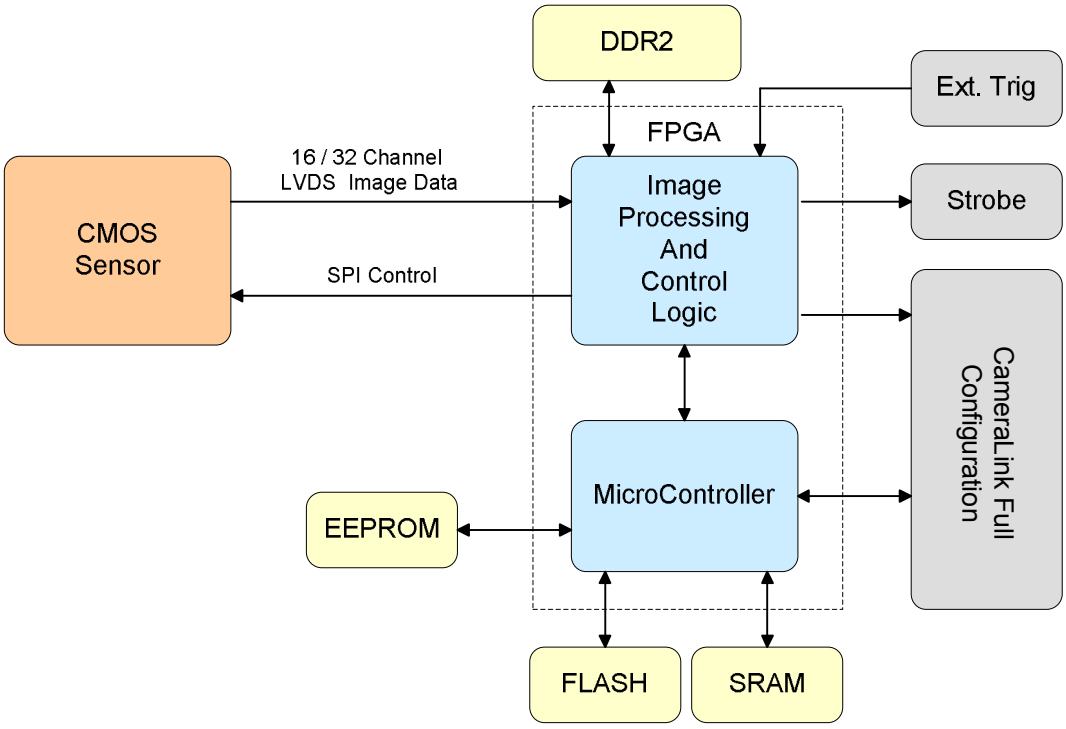


Image 5.1 System Block Diagram

- **Main Features**
  - High Speed 3 Mega-pixel CMOS image sensor
  - Electronic exposure time control(Global shutter)
  - Strobe Output
  - Output Channel 8 Tap, 10 Tap
  - Gain / Offset Control
  - Test Image
  - LVDS(RS-644) Serial Communication by Camera Link Interface
  - Temperature Monitor
  - Field Upgrade

5.1. Specifications

Model	VC-3MC-M/C280
Image Sensor	Cypress LUPA3000
Active Size	1696 X 1710 (3 Mega pixels)
Pixel Size	8.0 μm × 8.0 μm
Quantum Efficiency	37 % at 680 nm with micro lens
Imaging Area	H × V : 13.56 × 13.68 mm (Diagonal : 18.55 mm)
Sensor Type	CMOS (Mono / Color)
Frame Rate (at full Image)	8 Taps (Full) : 227 FPS 10 Taps (Full) : 284 FPS
Transfer Time (at full Image)	8 Taps (Full) : 4.41 ms 10 Taps (Full) : 3.51 ms
Dynamic Range	60 dB
Exposure Control	Electronic Global shutter
Pixel Clock	85 MHz
Data Output	8 bit
Trigger Input	Camera-Link : CC1 External Port : 3.3 – 5.0V Logic level input, optically isolated.
Gain Control	Range: 0~ 12 dB, 64-step Gain Control
Offset Control	Range: 0 ~ 63 LSB, 64-step Offset Control
Mechanical Spec. (W×H×L), weight	68 mm x 68 mm x 54 mm, 420 g (With F-mount)
Lens Mount	C Mount , F Mount
Power Requirements	12 VDC ± 20% MAX 6.0 W @ 12 V DC
Operation Temperature	Case temperature : 0 ℃ ~ 50℃ Inner temperature : 0 ℃ ~ 70℃
Connectors	Data Transfer/ Communication : Two, 26 pin, Female MDR connector Power : 6 pin, Hirose HR connector , Control : 4 pin, Hirose HR connector

Table 5.1 Specifications of VC Series

5.2. Spectral Response

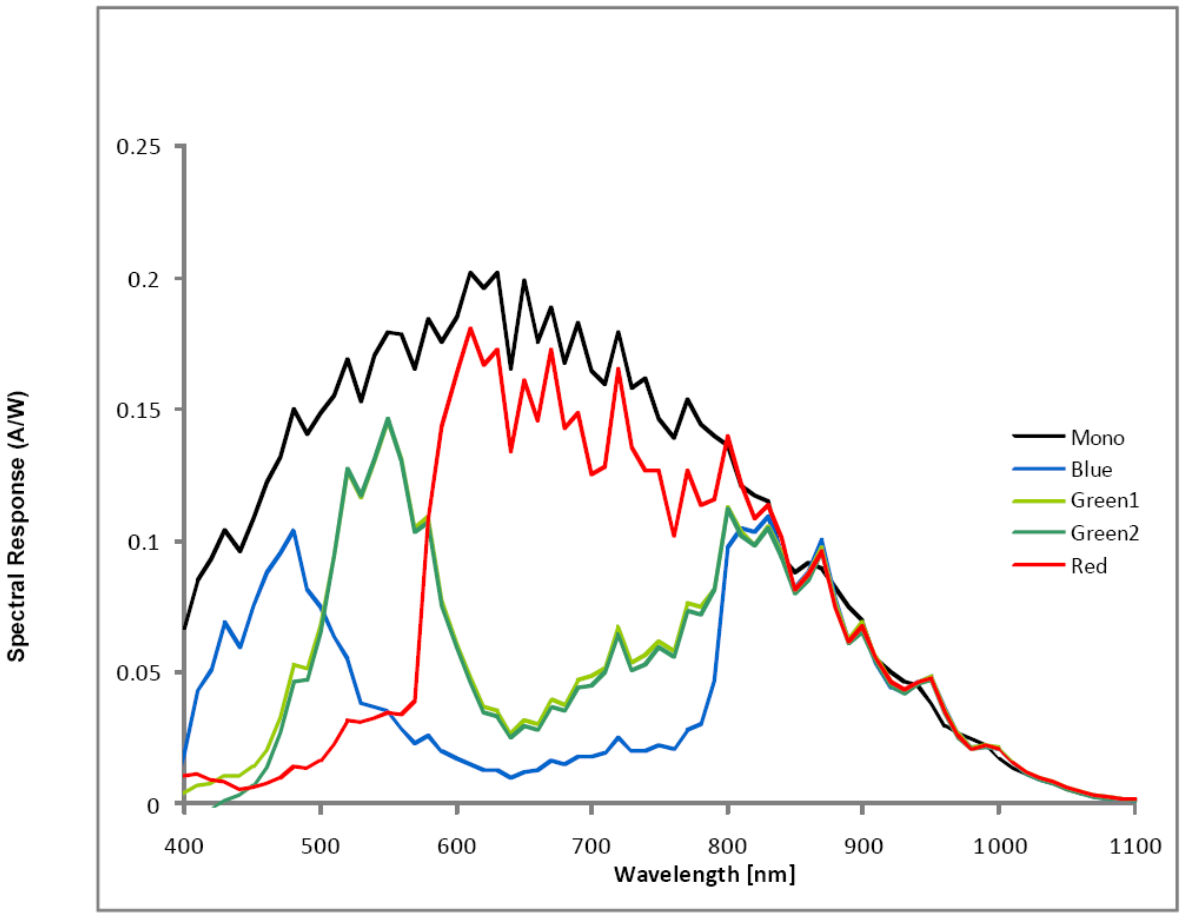


Image 5.2 Spectral Response for Mono and Color

5.3. Camera Interface

As shown in the following figure, 3 types of connectors and status indicator LED are located on the back of the camera and have the functions as follows:

- 6 pin Power Input Connector : camera power input,
- 4 pin Control Connector : external trigger signal input and Strobe output
- 26 pin Camera-Link Connector #1 : video data transmission, camera control
- 26 pin Camera-Link Connector #2: video data transmission
- Status LED : power and operation mode display

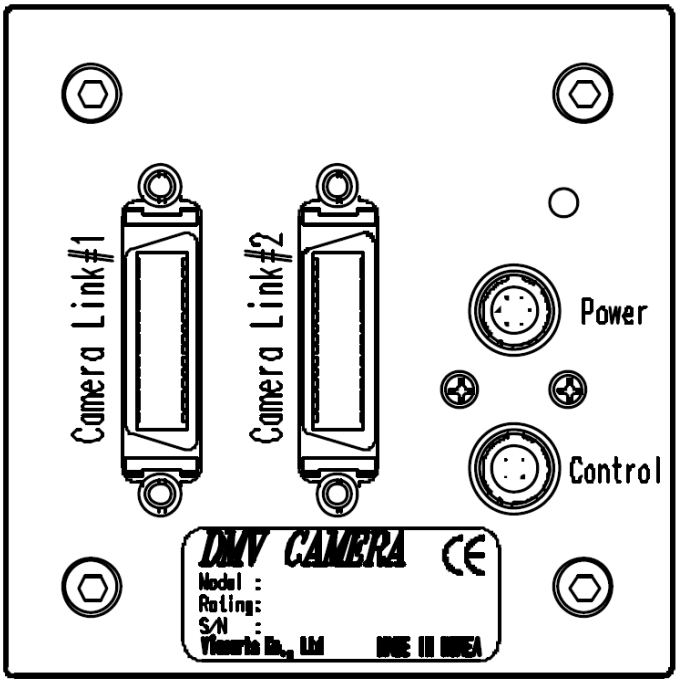


Image 5.3 VC Series Connectors and LED

Camera Link Connector

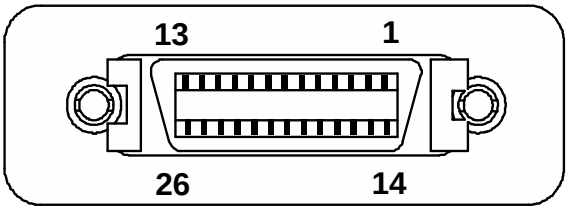


Image 5.4 Camera Link Connector

Following list shows the pin configuration of connector.

PAIR List	Pin	Signal Name	Type	Description
PAIR 0	**1**	Ground	Ground	Cable Shield
	14	Ground	Ground	Cable Shield
PAIR 1	**2**	-X0	LVDS - Out	Camera Link Transmitter
	15	+X0	LVDS - Out	Camera Link Transmitter
PAIR 2	**3**	-X1	LVDS - Out	Camera Link Transmitter
	16	+X1	LVDS - Out	Camera Link Transmitter
PAIR 3	**4**	-X2	LVDS - Out	Camera Link Transmitter
	17	+X2	LVDS - Out	Camera Link Transmitter
PAIR 4	**5**	-X3	LVDS - Out	Camera Link Transmitter
	18	+X3	LVDS - Out	Camera Link Transmitter
PAIR 5	**6**	-XCLK	LVDS - Out	Camera Link Transmitter
	19	-XCLK	LVDS - Out	Camera Link Transmitter
PAIR 6	**7**	- SerTC	LVDS - In	Serial Data Receiver
	20	+ SerTC	LVDS - In	Serial Data Receiver
PAIR 7	**8**	- SerTFG	LVDS - Out	Serial Data Transmitter
	21	+ SerTFG	LVDS - Out	Serial Data Transmitter
PAIR 8	**9**	- CC 1	LVDS - In	Software External Trigger
	22	+ CC 1	LVDS - In	Software External Trigger
PAIR 9	**10**	N/C	N/C	N/C
	23	N/C	N/C	N/C
PAIR 10	**11**	N/C	N/C	N/C
	24	N/C	N/C	N/C
PAIR 11	**12**	N/C	N/C	N/C
	25	N/C	N/C	N/C
PAIR 12	**13**	Ground	Ground	Cable Shield
	26	Ground	Ground	Cable Shield

Table 5.2 Pin Assignents for Camera Link Connector 1

PAIR List	Pin	Signal Name	Type	Description
PAIR 0	1	Ground	Ground	Cable Shield
	14	Ground	Ground	Cable Shield
PAIR 1	2	-Y0	LVDS - Out	Camera Link Transmitter
	15	+Y0	LVDS - Out	Camera Link Transmitter
PAIR 2	3	-Y1	LVDS - Out	Camera Link Transmitter
	16	+Y1	LVDS - Out	Camera Link Transmitter
PAIR 3	4	-Y2	LVDS - Out	Camera Link Transmitter
	17	+Y2	LVDS - Out	Camera Link Transmitter
PAIR 4	5	-Y3	LVDS - Out	Camera Link Transmitter
	18	+Y3	LVDS - Out	Camera Link Clock Tx
PAIR 5	6	-YCLK	LVDS - Out	Camera Link Channel Tx
	19	+YCLK	LVDS - Out	Camera Link Channel Tx
PAIR 6	7		Not Used	Connected with 100 ohm
	20		Not Used	
PAIR 7	8	-Z0	LVDS - Out	Camera Link Transmitter
	21	+Z0	LVDS - Out	Camera Link Transmitter
PAIR 8	9	-Z1	LVDS - Out	Camera Link Transmitter
	22	+Z1	LVDS - Out	Camera Link Transmitter
PAIR 9	10	-Z2	LVDS - Out	Camera Link Transmitter
	23	+Z2	LVDS - Out	Camera Link Transmitter
PAIR 10	11	-Z3	LVDS - Out	Camera Link Transmitter
	24	+Z3	LVDS - Out	Camera Link Clock Tx
PAIR 11	12	-ZCLK	LVDS - Out	Camera Link Channel Tx
	25	+ZCLK	LVDS - Out	Camera Link Channel Tx
PAIR 12	13	Ground	Ground	Cable Shield
	26	Ground	Ground	Cable Shield

Table 5.3 Pin Assignments for Camera Link Connector 2

Model	Camera-Link Output Mode	Camera-Link Configuration	Camera-Link Connector 1	Camera-Link Connector 2
VC2 – 3M	2 Tap's	BASE	Not Supported	Not Supported
	4 Tap's	MEDIUM	Not Supported	Not Supported
	8 Tap's	FULL	O	O
	10 Tap's	FULL	O	O

Table 5.4 Connector Connection per Camera Link Output Mode

In connecting the connector to Frame Graber, it is required to be careful of sequence of Camera Link Connector. If the sequence is changed, camera image output and serial communication do not work properly.

Power Input Connector

Power input connector of camera is Hirose 6 pin connector(part # HR10A-7R-6PB). Pin arrangement and configuration are as follows:

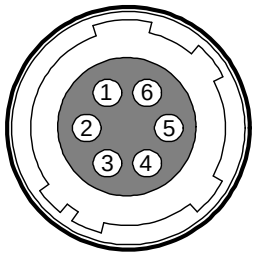


Image 5.5 Pin Arrangement of Power Input Connctor

Pin Number	Signal	Direction	Function
1, 2,3	+ 12V DC	Input	DC Power Input
4,5,6	DC Ground	Input	DC Ground

Table 5.5 Pin Configuration of Power Input Connector

Power plug can be configured using the Hirose 6 pin plug (part # HR10A-7P-6S) or compatible parts enclosed in the camera box. For power supply, it is recommended to use the power adapter twith over 1A current output at 12VDC ±10% voltage output.

Cautions for Power Input

Make sure to connect the power wiring of camera after checking the camera input power is turned off. If not, it may result in damage of camera.

If the voltage over 16V is applied beyond the power voltage input of camera, circuit inside camera can be damaged.

Control Connecter

control connector is Hirose 4 pin connector(part # HR10A-7R-4S) and consists of external trigger signal input and strobe output port. Pin arrangement and configuration are as follows:

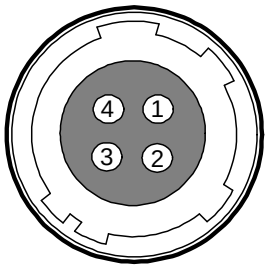


Image 5.6 Pin Arrangement of Control Connector

Pin Number	Signal	Direction	Function
1	**Trigger Input +**	Input	
2	**Trigger Input -**	Input	
3	**DC Ground**	-	DC Ground
4	**Strobe Out**	Output	3.3V TTL Output Output resistance : 47 Ω

Table 5.6 Pin Arrangement of Control Connector

Matching plug connector can use Hirose 4 pin plug(part # HR10A-7P-4P) or equivalent connector.

Trigger Input Circuit

Following figure shows trigger signal input circuit of 4 pin connector. Trigger signal entered is delivered to internal circuit through photo coupler. Minimum trigger width that can be recognized at camera is 1us. If trigger signal entered is less than 1us, trigger signal is ignored in camera. External trigger signal can approve signals to the circuits in the 2 methods shown below.

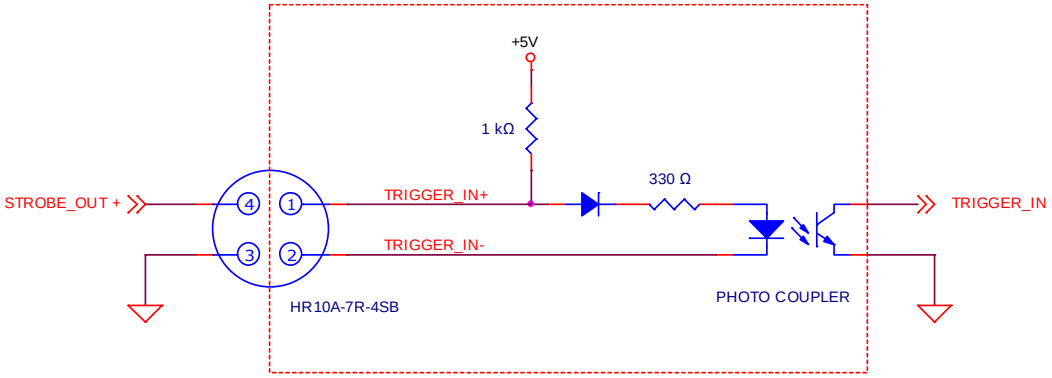


Image 5.7 Trigger Input Schematic

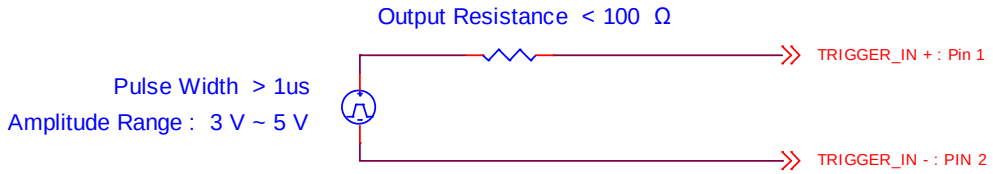


Image 5.8 Recommended Pulse Trigger Driver Input

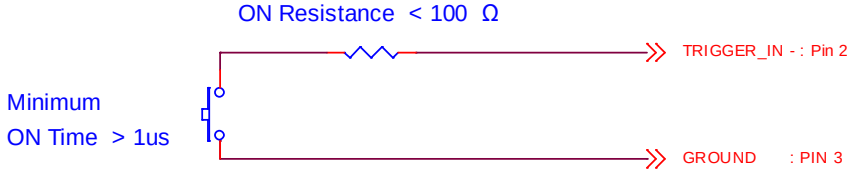


Image 5.9 Recommended Contact Trigger Input

Strobe Output Circuit

Strobe output signal is output through TTL Driver IC of 3.3 V output level and pulse width of signal is output in synchronization with exposure of camera.

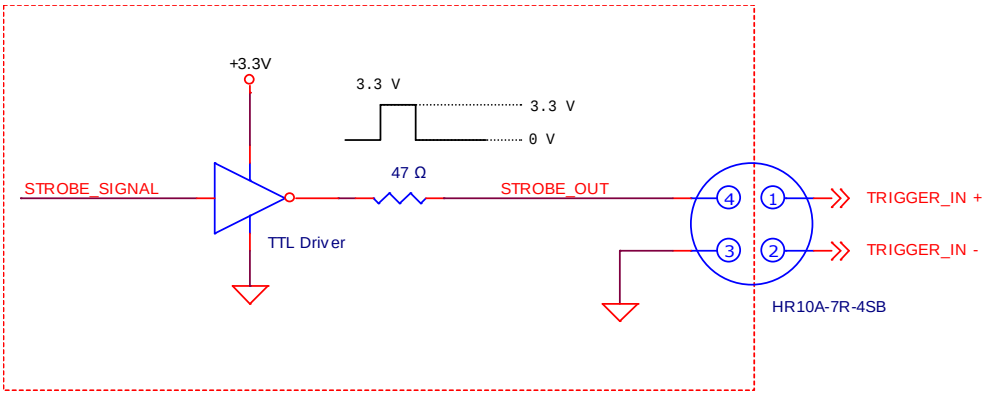


Image 5.10 Strobe Out Schematic

5.4. Mechanical Specification

Mechanical Dimension

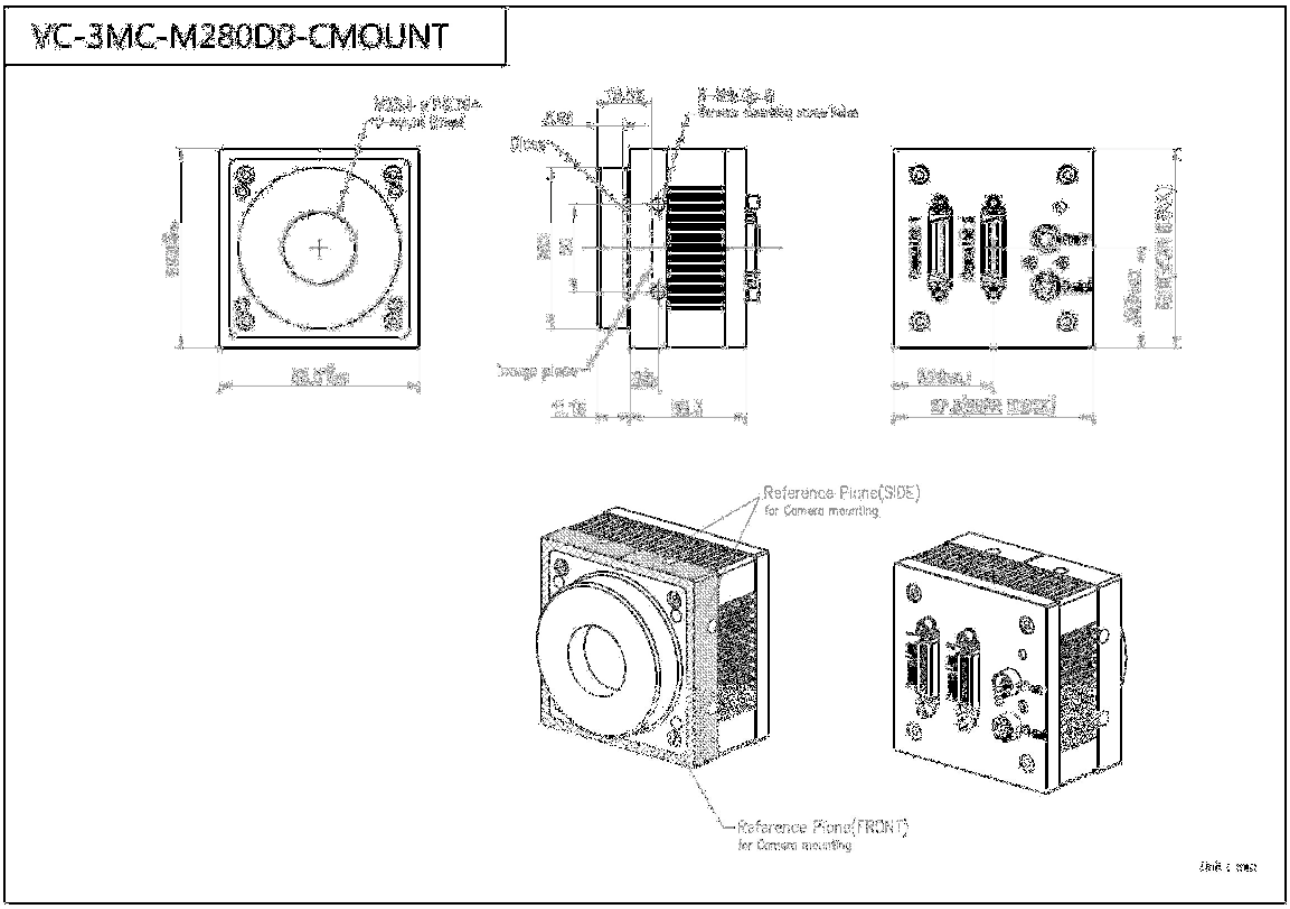


Image 5.11 Mechanical Dimensions(in mm)

6. Camera Features

6.1. Area Of Interest (AOI)

AOI is the area containing the data required by the user among total areas of image. The user can obtain the image faster, with the quality same as when obtaining overall areas by designating the area as AOI when part of area is required in all areas. AOI is determined as the overlapping area of 2 areas when designating Start point and End point in horizontal and vertical direction as shown in Fig 6.1. Start point and End point mean the starting and end of the area. The narrower Vertical and Horizontal AOI gets, the faster the frame speed.

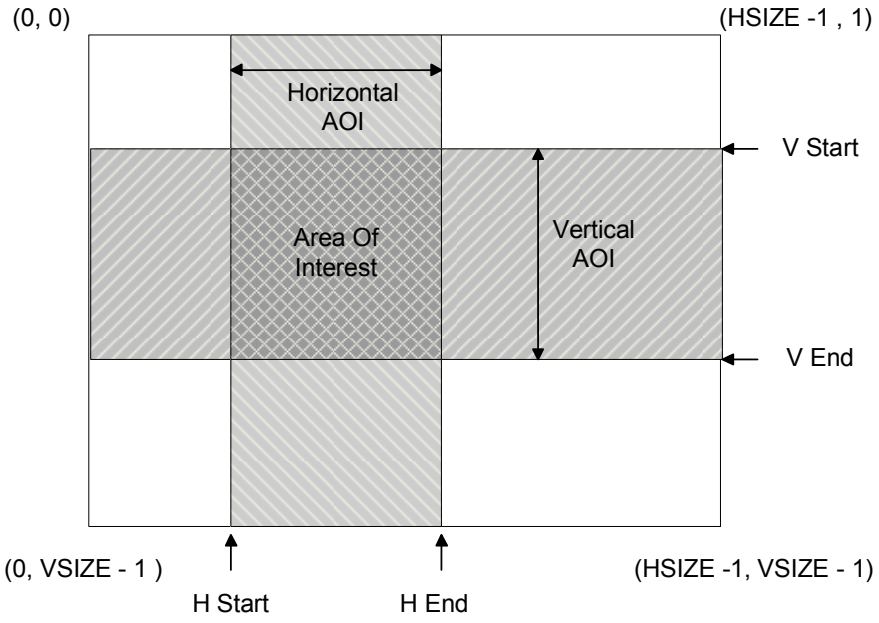


Fig 6.1 AOI

Maximum frame speed depending on change of AOI size as shown in the following table.

AOI Size	2 Tap	4 Tap	8 Tap	10 Tap
640 X 480	-	-	1830 fps	2288 fps
1024 X 768	-	-	807 fps	1010 fps
1280 X 1024	-	-	486 fps	632 fps
1600 X 1200	-	-	346 fps	432 fps
1680 X 1680	-	-	229 fps	296 fps
1696 X 1710	-	-	227 fps	284 fps

Table 6.1 Maximum Frame Rate per AOI setting

AOI Size	H Start	H End	V Start	V End
640 X 480	528	1167	615	1094
1024 X 768	336	1359	471	1238
1280 X 1024	208	1487	343	1366
1600 X 1200	48	1647	255	1454
1680 X 1680	8	1687	15	1694
1696 X 1710	0	1695	0	1709

Table 6.2 Optimum AOI Setting Value per AOI Size

The CMOS sensor for VC Series uses the Global Shutter method. Below Exposure Timing Diagram shows the CMOS Exposure and Readout Time. The Readout of the photoelectron signals is proceed from the first line and progressively. The Readout Time is normally called as Transfer Time and it shows the time that takes 1 frame of image.

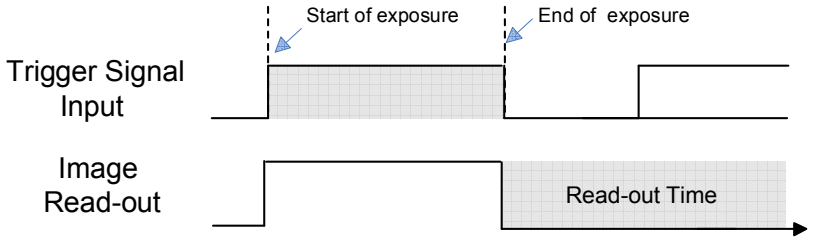


Image 6.1 Exposure Timing Diagram

6.2. Trigger Mode

Trigger mode of camera is divided into Free-Run mode where image is synchronized to Internal Trigger signal created inside camera, and External Sync mode where image is synchronized to the trigger signal entered in external port.

FreeRun Mode

In FreeRun mode, the cycle of internal trigger signal is determined by Transfer Time (1 Frame data transmission time) and Exposure setting value, and image is obtained with such periodic signal. Cycle of internal signal, that is, Frame Rate, is determined with the following 2 conditions.

- **Case 1 : Exposure Time < Frame Transfer time**

  ➔ Frame Rate(FPS) = 1/ Frame Tranfer Time (sec) : has fixed value

  - Case 2 : Exposure Time > Frame Transfer time

  ➔ Frame Rate(FPS) = 1 / Exposure Time (sec) : change depending on Exposure Time value.

  -

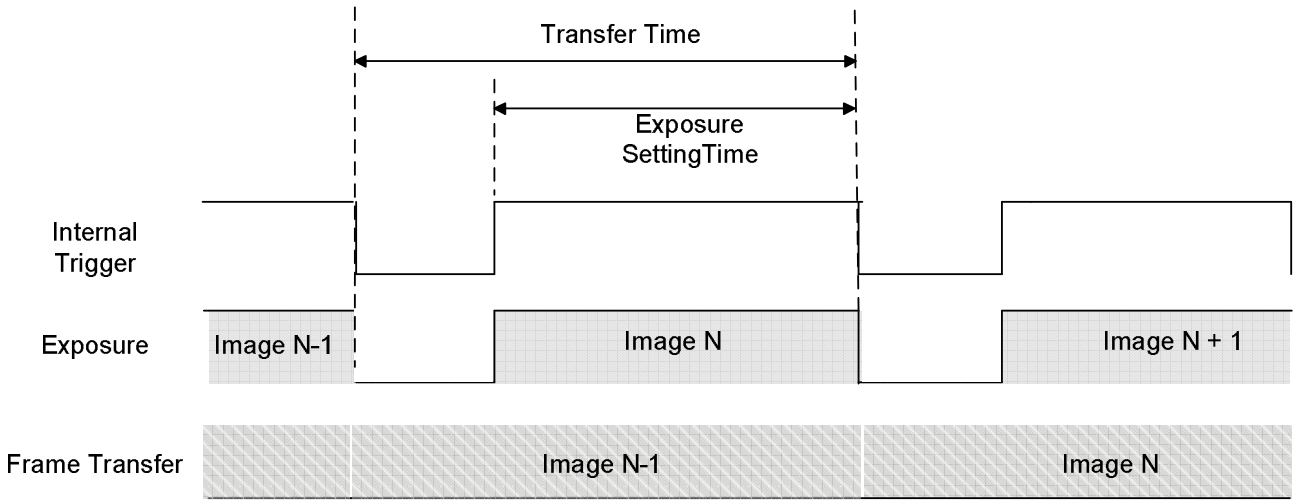


Image 6.2 Exposure Time is Shorter than Readout Time

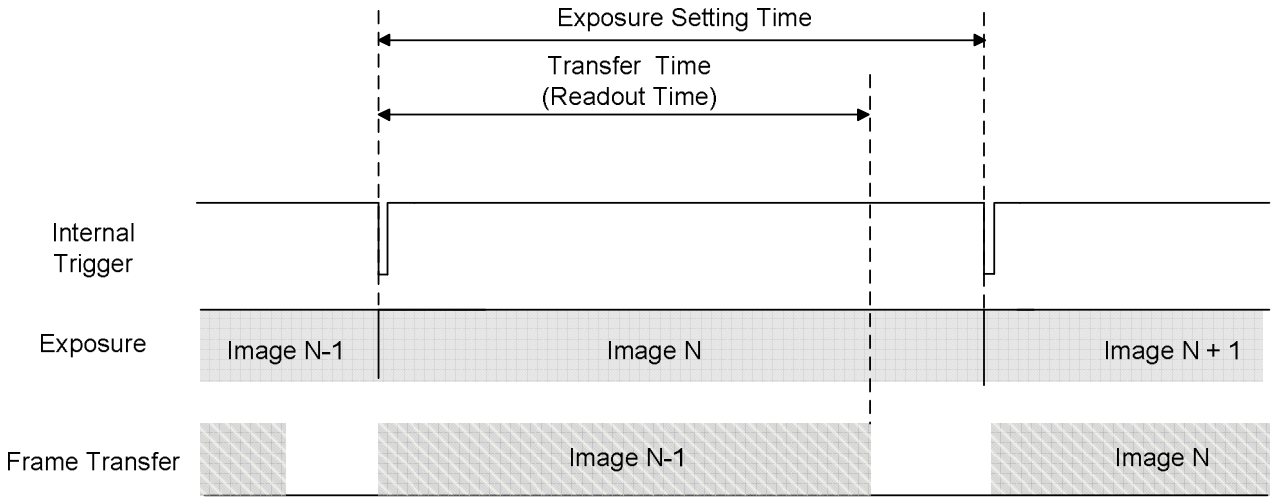


Image 6.3 Exposure Time is longer than Readout Time

External Sync Mode

In External Sync Mode, camera keeps standby status until trigger signal is entered and performs image transmission (Frame Transfer) after exposure process if trigger input occurs as shown in Image 6.4. To operate camera in External Sync mode, it is required to set Trigger Source regarding which input, CC1 input port or External Trigger port, will be used for trigger signal, as well as Polarity and Exposure source of signal entered.

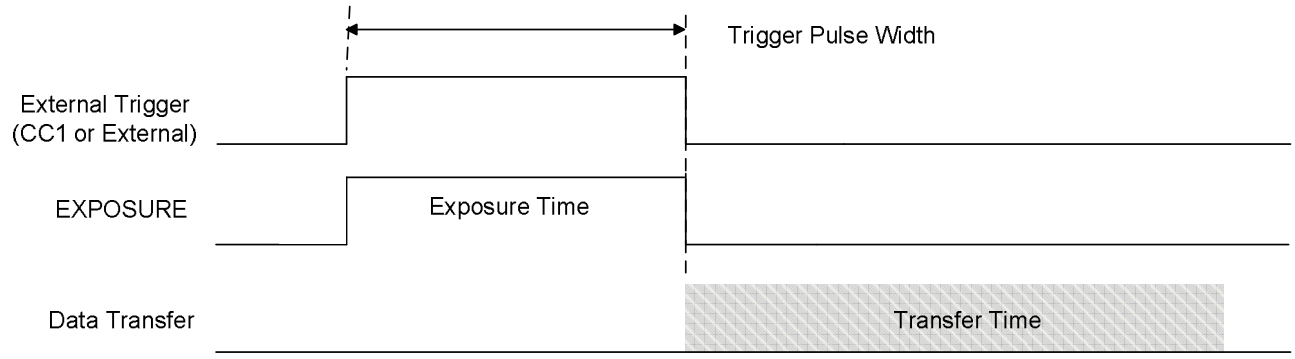


Image 6.4 External Sync Mode

Following is the summary of basic setting items.

- **Trigger Source : select either of CC1(Camera Control Port 1) and External Connector as source of external trigger input signals.**
- **Trigger Polarity : set whether polarity of Trigger signal entered is Active High or Active Low.**
- **Exposure Source : select to synchronize exposure time with pulse width of trigger input signal or with exposure time programmed inside the camera.**

6.2.1.1. Overlap Trigger input

When trigger input occurs in the course of Frame Transfer and Image 6.5, it simultaneously performs exposure of next image for new trigger input. In this case, image shooting is possible up to the speed of 1/Transfer Time(sec), the Maximum Frame Rate conditions regardless of exposure time.

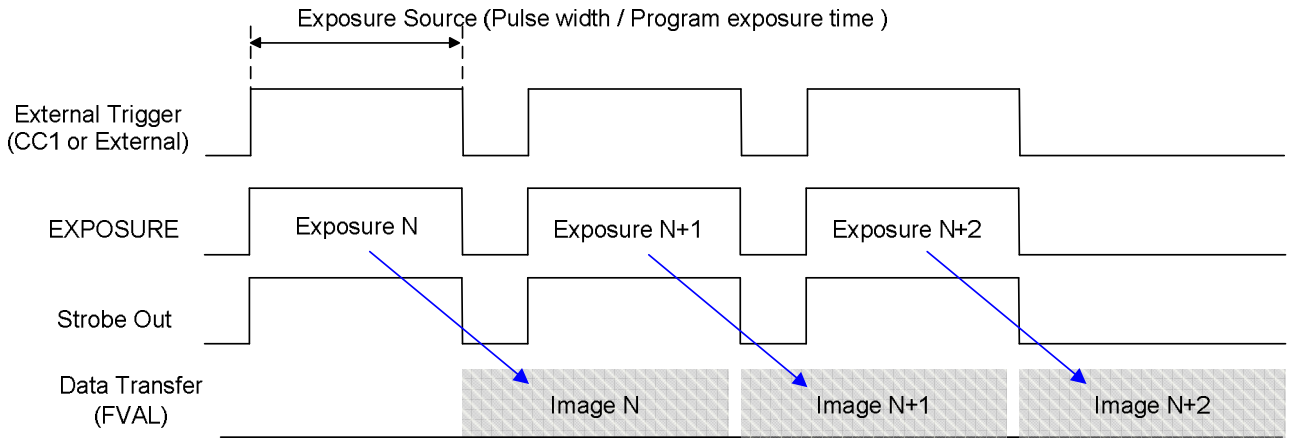


Image 6.5 Camera Operation at Input of Overlap Trigger

Following list shows the operation of camera on exceptional trigger input.

- **When the trigger signal with cycle faster than maximum FrameRate conditions, next Frame Transfer is performed while one Frame Transfer is not completed, failing to obtain overall image.**
- **When new trigger input occurs in Exposure section while Exposure Source is set in Program, the signal is ignored. It is the case that exposure setting value is set longer than trigger input cycle, and since it is not synchronized for all trigger signal entered in camera, Frame Rate gets slower than Trigger input cycle.**

6.3. Camera Link Output

VC-3M model supports 8 Tap and 10 Tap output modes according to user interface. Tap setting value means the number of pixel data output for each cycle of Pixel Clock (85 MHz), and speed of Frame Data transmission varies depending on tap setting. Frame Data is output in interleaved type and as shown in Image 6.6. This Tap setting can be set using “scl” command.

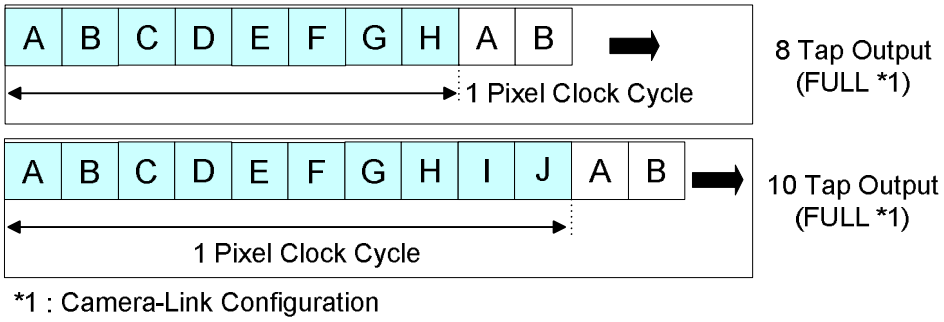

A B C D E F G H A B
1 Pixel Clock Cycle
8 Tap Output
(FULL *1)
A B C D E F G H I J A B
1 Pixel Clock Cycle
10 Tap Output
(FULL *1)
*1 : Camera-Link Configuration

Image 6.6 Camera Link Output configuration

6.4. Gain and Offset

Gain and Offset can be changed through Voltage Reference adjustment applied commonly to all ADCs. Gain adjustment scope can be set between 0 ~ 12 dB and setting value has values in 64 steps. Relation between setting value and actual Gain(dB) are as shown below:

Gain(dB) = (setting value) x 0.19dB

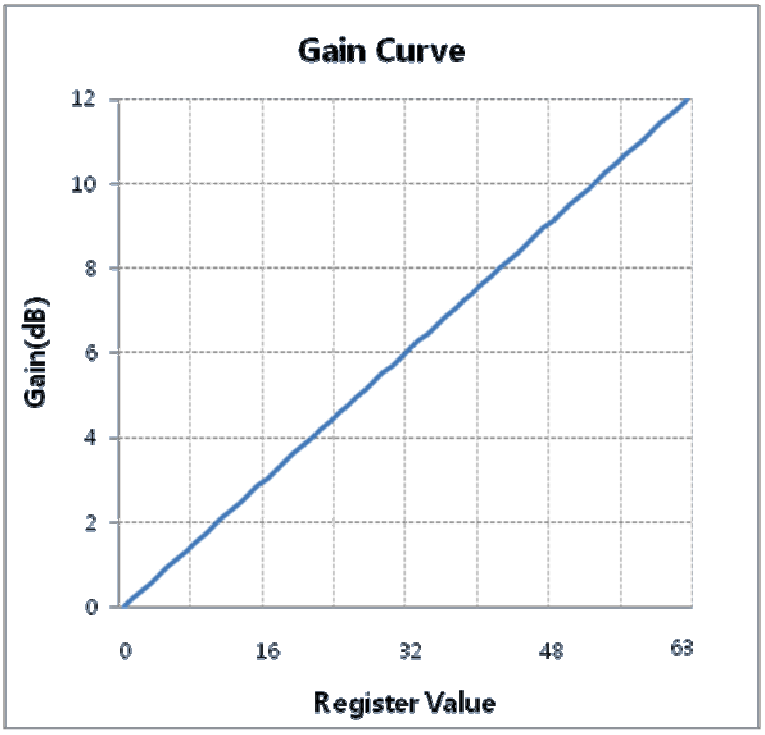


Image 6.7 Register Setting vs Gain

Offset can be set between 0 ~ 64 (LSB) based on 8 bit Data output and setting value has a total of 64 steps value.

6.5. Temperature Monitor

Camera has sensor chip for monitoring internal temperature. “gct” command is used to check the temperature of camera.

6.6. Status LED

Green LED on back of camera shows the operation status of camera. LED status and camera status corresponding to this are as follows:

- **Continuous ON Status** – camera operates in Free-Run Mode
- **ON for 0.5 sec. and OFF for 0.5 sec. repeats** – camera operates in Trigger Mode.
- **ON for 1 sec. and OFF for 1 sec. repeats** – Test Image is output.
- **ON for 0.25 sec. and OFF for 0.25 sec. repeats** – operates in Trigger Mode and Test Image is output

6.7. Test Image

It can be set to output test image created inside instead of image data output from image sensor, in order to check normal operation of camera. 3 types of test image are available; image with different values in horizontal direction (Image 6.8), images with different values in diagonal direction (Image 6.9), and moving image with different values in diagonal direction (Image 6.10). Test image can be applied to all operation modes of camera and set using “sti” command.

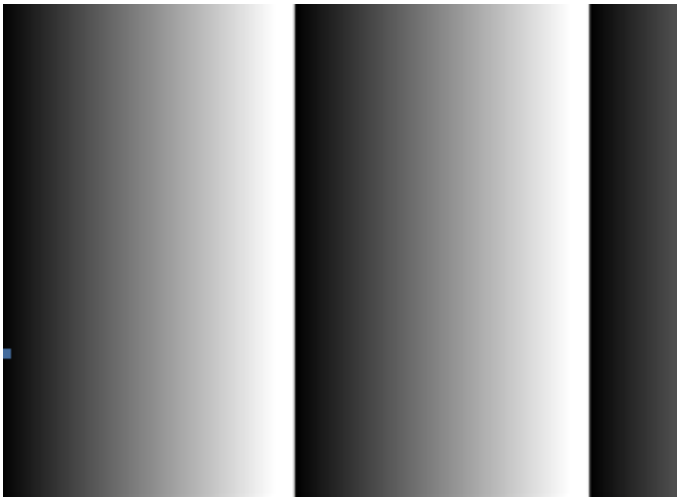


Image 6.8 Test Image 1

Image 6.9 Test Image 2

Image 6.10 Test Image 3 (Moving Pattern)

6.8. Strobe Out

Strobe output is the function to output the signal synchronized to exposure time of camera in operation, to External Port. The wave form of the output signal is as below.

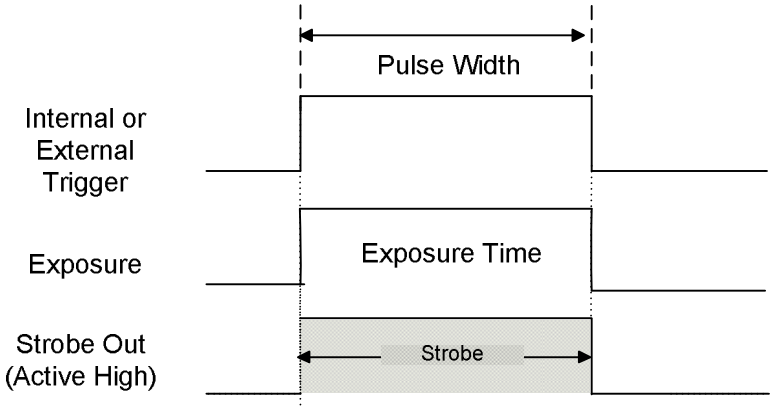


Image 6.11 Strobe Signal in Trigger Mode

Strobe out Polarity

Polarity can be set fur Strobe signal output. “ssp” command is used to set the polarity of strobe signal.

6.9. Field Upgrade

This camera has the function to upgrade firmware and FGPA logic through RS-644 interface of CameraLink, rather than disassembly of camera in the field. See Appendix A for how to change in details.

6.10. Dark Image Correction

Fixed Pattern Noise of CMOS sensor varies depending on operating temperature of camera due to change in features according to temperature of ADC and sensor cell It may result in lower sensitivity at Dark Level. Sensitivity change due to temperature change is less than 1 dB/10 degree. The variation due to temperature change is not big and acquisition condition of corrected data is 25 degree based on case temperature. For optimization of user to environmental conditions, it is recommended to correct after the temperature of camera case gets stabilized while camera is installed.

- **Correction Sequence of Camera Dark Image**

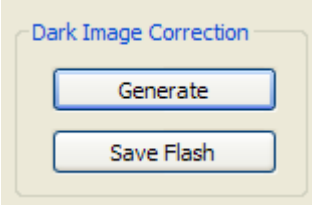


Fig. 6.12 Items of Dark Image Correction at Configurator

- How to Correct Image using Configurator

1. Prevent penetration of light into camera image sensor.
2. Click “Generate” button in “Dark Image Correction” item of “View” tab to generate correction data.
3. Click “Save Flash” button of “Dark Image Correction” item of “View” tab to save correction data in the flash memory.

- How to Correct Image using Serial Command

1. Prevent penetration of light to camera image sensor.
2.Use terminal command “gop” to generate correction data in camera.
3. Use terminal command “sop” to save correction data in flash memory.

7. Serial Communication

7.1. Setup command

All setup in camera is carried out RS-644 serial interface of camera link. With the following communication setting, it can be controlled using terminal or direct control at user application.

- BOUD Rate : 19200 bps
- Data Bit : 8 bit
- Parity Bit : No Parity
- Stop bit : 1 stop bit
- Flow control : None

All types of camera setting commands except Firmware Download, requiring massive data transmission are delivered in ASCII command type. All camera setup commands start from user application and the camera returns the response(“OK”, “Error” or information) for command The camera informs the completion of command execution through response with write command, while the camera returns the error response or information with read command.

Command format

<command> <parameter1> <parameter2> <cr>

0~2 parameters follow the command.

Response:

- If execution of write command is successfully completed

OK <cr> <lf> <prompt>

- If execution of read command is successfully completed

<parameter1> <cr> <lf> <prompt>

- If execution of command is not completed

Error : <Error Code> <cr> <lf> <prompt>

ex) Write command

In response to a “set 100” command the camera will return (in hex value)

Command : set 100<cr>

(73 65 74 20 31 30 30 0D)

Response : Set 100<cr><lf> OK<cr><lf> >

(73 65 74 20 31 30 30 0D 0A 4F 4B 0D 0A 3E)

ex) Read command

In response to a “get” command the camera will return (in hex value)

Command : get <cr>

67 65 74 0D

Response : 67 65 74 0D 0A 31 30 30 0D 0A 3E

get<cr><lf> 100<cr><lf> >

echo response prompt

Types of Error Code

0x80000481 : values of parameter not valid

0x80000482 : number of parameter is not matched

0x80000484 : command that does not exist

0x80000486 : no execution right

7.2. Parameter Storage Space

The camera has 3 non-volatile storage space used for parameter storage and 1 volatile work space that is applied to actual camera operation. 3 storage space is divided into Factory Space that contain basic value at the factory, and 2 user space(User Space 1, User Space 2) that can save parameter value temporarily set by the user. User space can be read and written, but Factory space can be read only.

At camera booting, setting value in one of 3 storage spaces is copied to work space according to Config Initialization value and value of the space is used for camera setting. Since values in work space is valid only while the power is on, it should be copied to user space 1 or user space 2 using “sct” command.

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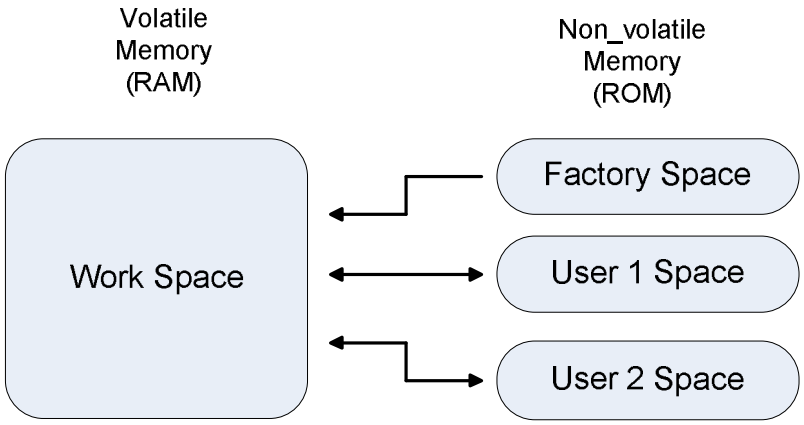

Image 7.1 Parameter

Camera Setting Command List

Command	Syntax	Value Returned	Description
Help	h	String	Displays a list of all commands
Set Read-Out Mode **Get Read-Out Mode**	srm 0|1 grm	OK 0|1	0 : Nomal Mode 1 : AOI(Area Of Interest) Mode (AOI area is set using “sha” and “sva” commands)
Set Horizontal Area **Get Horizontal Area**	sha n1 n2 gha	OK n1 n2	n1: Starting point of horizontal direction n2 : End point of horizontal direction
Set Vertical Area **Get Vertical Area**	sva n1 n2 gva	OK n1 n2	n1 : Starting point of vertical direction n2 : End point of vertical direction
Set Trigger Mode **Get Trigger Mode**	stm 0|1 gtm	OK 0|1	0 : Free Run Mode 1 : Trigger/Overlap Mode
Set Trigger Source **Get Trigger Source**	sts 1|2 gts	OK 1|2	1 : CC1 Port Input 2 : External Input
Set Trigger Polarity **Get Trigger Polarity**	stp 0|1 gtp	OK 0|1	0 : Active Low 1 : Active High
Set Exposure Time **Get Exposure Time**	set n get	OK N	n : Exposure Time in us (Setting range : 10 ~ 7,000,000 us)
Set Analog Gain **get Analog Gain**	sag n gag	OK n	n :Analog Gain Parameter (Setting Range : 0 ~ 63)
Set Analog Offset **get Analog Offset**	sao n gao	OK n	n :Analog Gain Parameter (Setting Range : 0 ~ 63)
Set Test Image **Get Test Image**	sti 0|1|2|3 gti	OK 0|1|2|3	0 : OFF 1,2 : Fixed Pattern Image 3 : Moving Pattern Image
Set Strobe Polarity **Get Strobe Polarity**	ssp 0|1 gsp	OK 0|1	0 : Active Low 1 : Active High
Generate Offset-Calibration Data	god	OK	Generate offset Calibration Data to the volatile Memory
Save Offset-Calibration Data	sod	OK	Save offset Calibration Data to the Flash Memory
Load Offset-Calibration Data	Lod	OK	Load offset Calibration Data from the Flash Memory (the calibration data is loaded Automatically at the Stat-up status)

Set Camera-Link Mode	scl 2|3	OK	2 : 8 Tap's Output
Get Camera-Link Mode	gcl	2|3	3 : 10 Tap's Output

Camera Configuration Command List

Command	Syntax	Value Returned	Description
Save Config To	sct 1|2	OK	1 : Save to User 1 Setting 2 : Save to User 2 Setting
Load Config From	lcf 0|1|2	OK	0 : Load from Factory Setting 1 : Load from User 1 Setting 2 : Load from User 2 Setting
Set Config Initialization **Get Config Initialization**	sci 0|1|2 gci	OK 0|1|2	0 : Load from Factory Setting when initializing 1 : Load from User 1 Setting when initializing 2 : Load from User 2 Setting when initializing
Get Model Name	gmn	String	Displays Model Name
Get MCU Version	gmv	String	Displays MCU Version
Get FPGA Version	gfv	String	Displays FPGA Version
Get Serial Number	gsn piece	String	Display Serial Number
Get Current Temperature	gct	String	Display Temperature Value

7.3. Configurator GUI

Camera Scan

When you execute the program while the camera is turned on, Camera Scan window appears as shown in Image 7.2. At this time, the program checks serial port of computer and DLL provided by CameraLink to scan whether the camera is connected. If there is a camera connected, it displays model name on the screen. If the camera is not properly displayed on the screen, check the connection of cable with power of camera and press refresh button. When you double-click model name displayed on the screen, Configurator is executed and displays current setting value of camera connected.

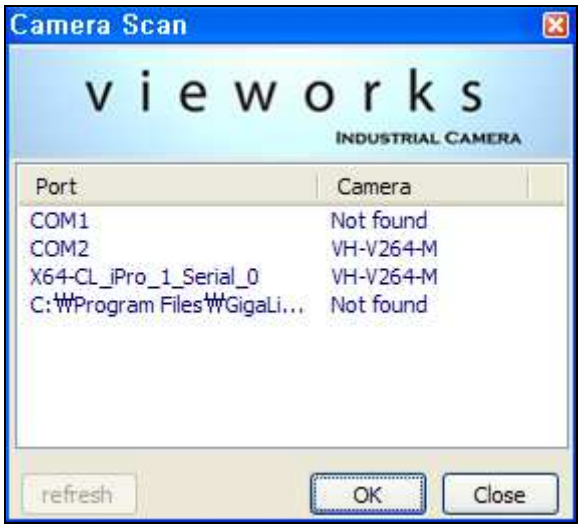

Image 7.2 Camera Cofigurator Loading Window

Menu

7.3.1.1. File

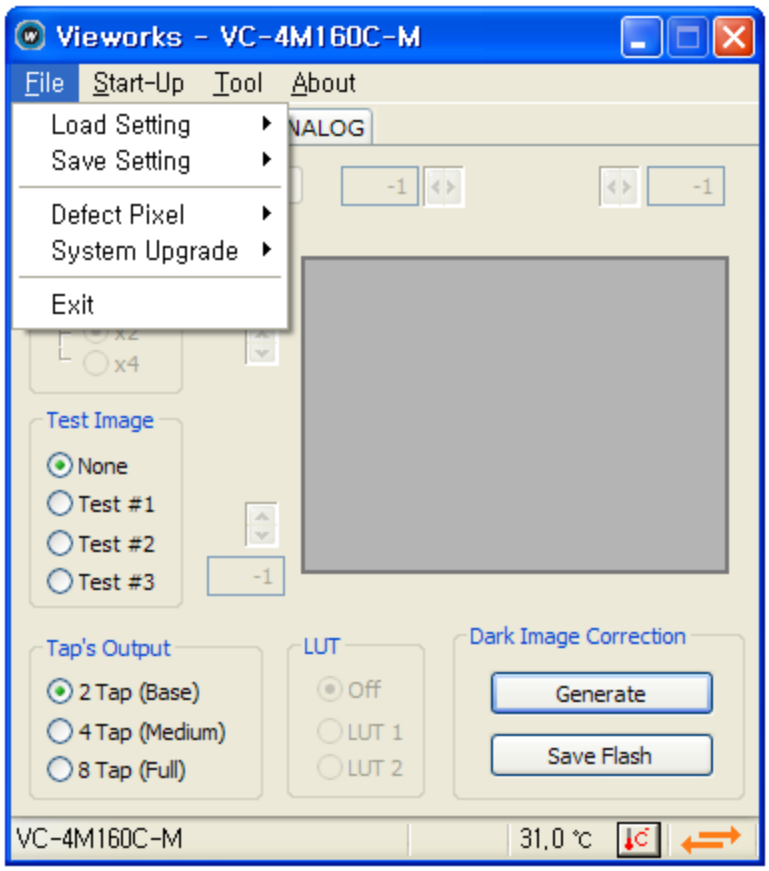

Image 7.3 File Menu

- **Load Setting** : load setting value of camera, from setting value storage space(Factory, User1, User2) inside the camera or file in the computer.
- **Save Setting** : save setting value of camera in setting value storage space(User1, User2) inside the camera or file in the user computer.
- **Defect Pixel** : Defect pixel download /upload not supported in VC-3M model.
- **System Upgrade** : upgrade MCU program or FPGA logic.
- **Exit** : exit program.

7.3.1.2. Start-Up

The menu to select the space to load the setting value from, when the camera is turned on.

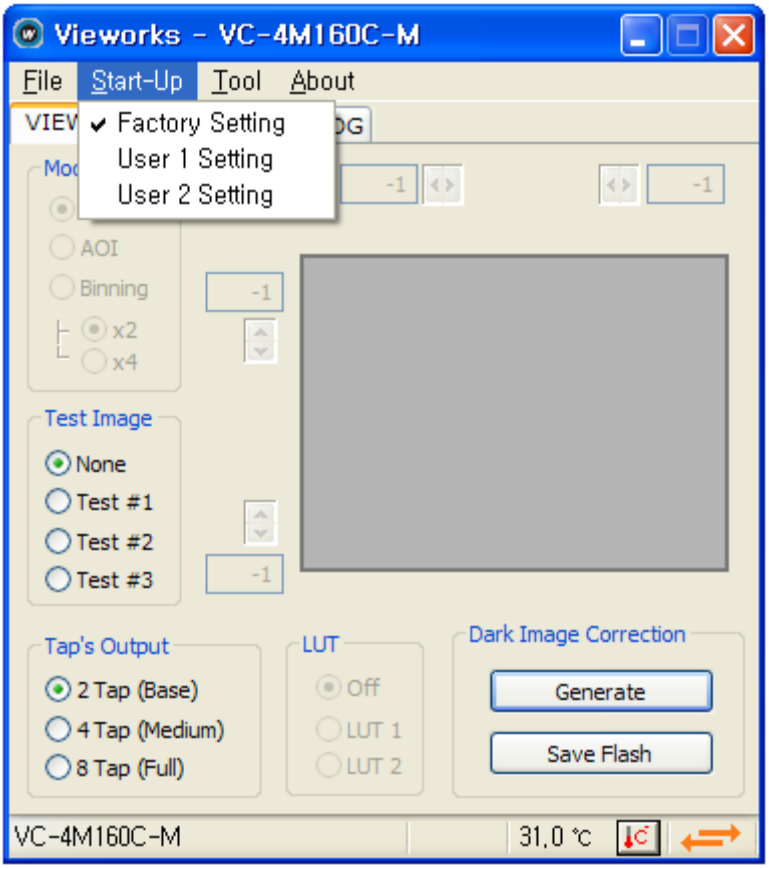

Image 7.4 Start-Up Menu

- **Factory Setting** : load the setting value from Factory space when camera is turned on.
- **User1 Setting** : load the setting value from User1 space when camera is turned on.
- **User2 Setting** : load the setting value from User2 space when camera is turned on.

7.3.1.3. Tool

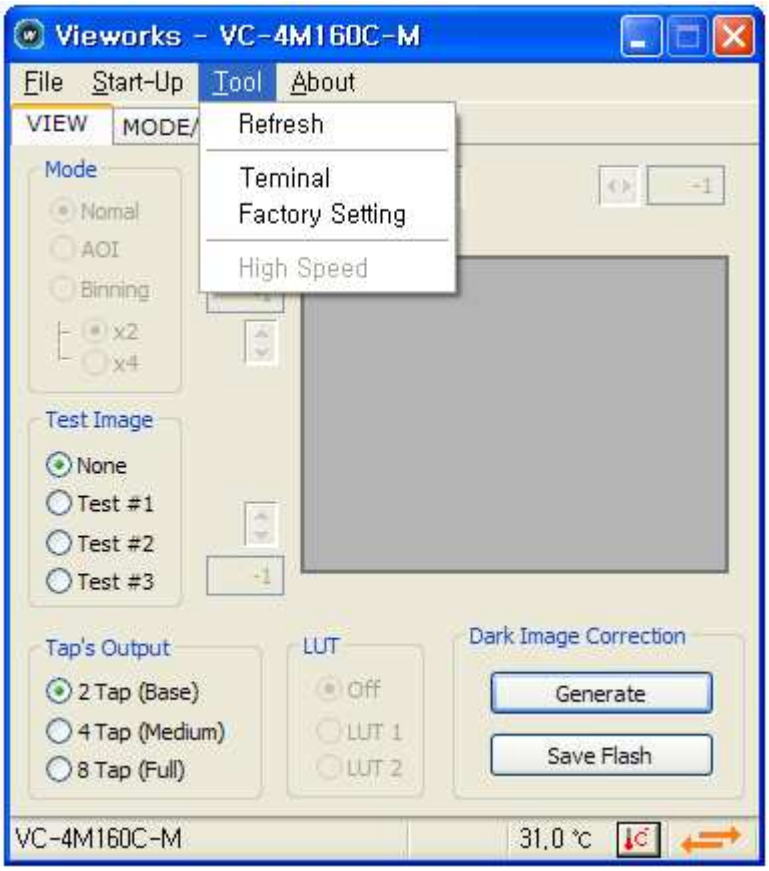

Image 7.5 Tool Menu

- **Refresh** : Read the current setting value of camera and display on program.
- **Terminal** : Display user command in GUI in terminal. Click to display the terminal window on the lower part of program and click again to hide Terminal window.
- **High Speed** : Not supported in VC Model.

7.3.1.4. Help

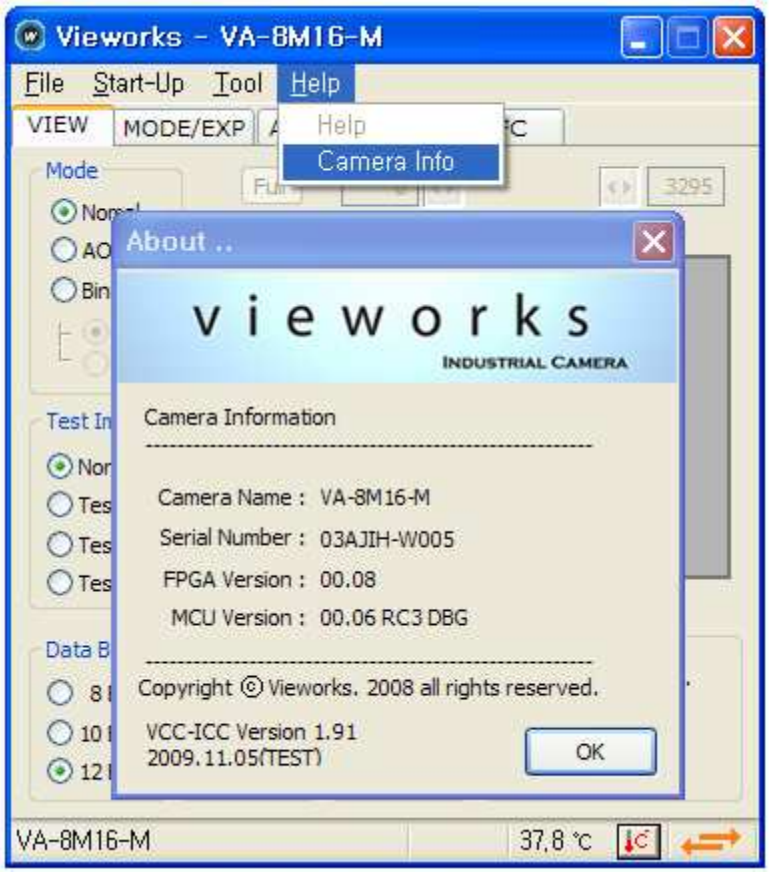

Image 7.6 About Menu

- **Camera Info** : display camera information (product name, serial number, version, etc.).

Tab

7.3.1.5. VIEW tab

This tab is to control overall functions of camera.

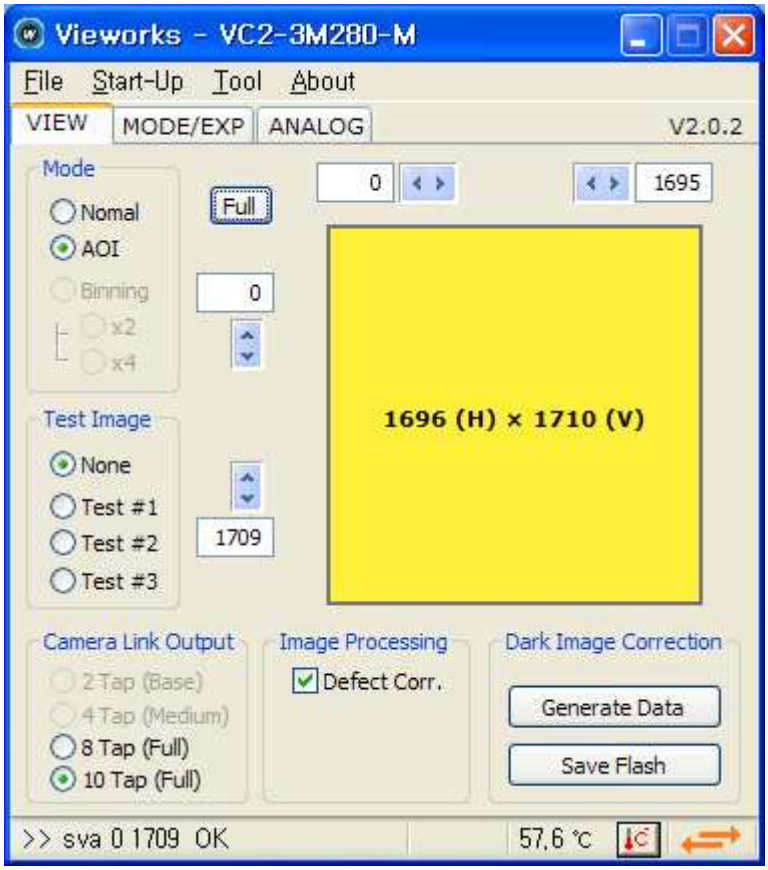

Image 7.7 VIEW Tab

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- **Mode** : Normal 모드는 카메라의 Full 해상도의 영상을 출력하며 AOI 모드는 미리 설정된 국소 영역의 영상을 출력한다.
- **Test Image** : select whether to apply test image and the type of test image.
- **Tap's Output** : set camera link(Camera-Link) output mode.(Only VC-4M110C Model)
- **Dark Image Correction** : correct Fixed Pattern Noise at camera dark image

7.3.1.6. MODE/EXP Tap

This tab is to set Trigger mode, exposure time and Strobe setting.

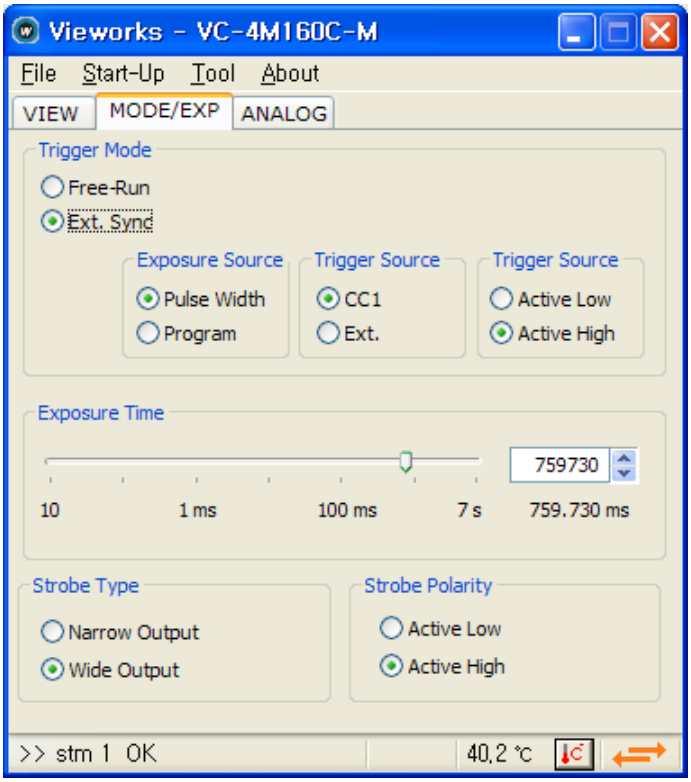


Image 7.8 MODE/EXP Tab

- **Trigger Mode** : set the Trigger mode.
- **Exposure** : select Exposure source.
- **Source** : select Trigger source.
- **Polarity** : select polarity of Trigger input.
- **Exposure Time** : set the exposure time to be applied in Free-Run mode and when exposure source is set in program.
- **Strobe Type** : set Strobe Type.
- **Strobe Polarity** : set polarity of strobe output signal.

7.3.1.7. ANALOG Tab

This tab is to set gain and Offset setting of image.

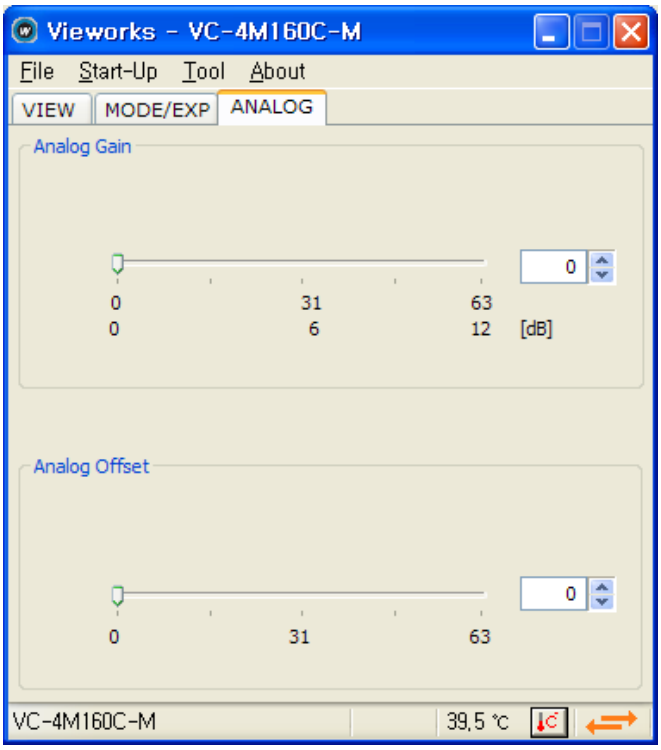
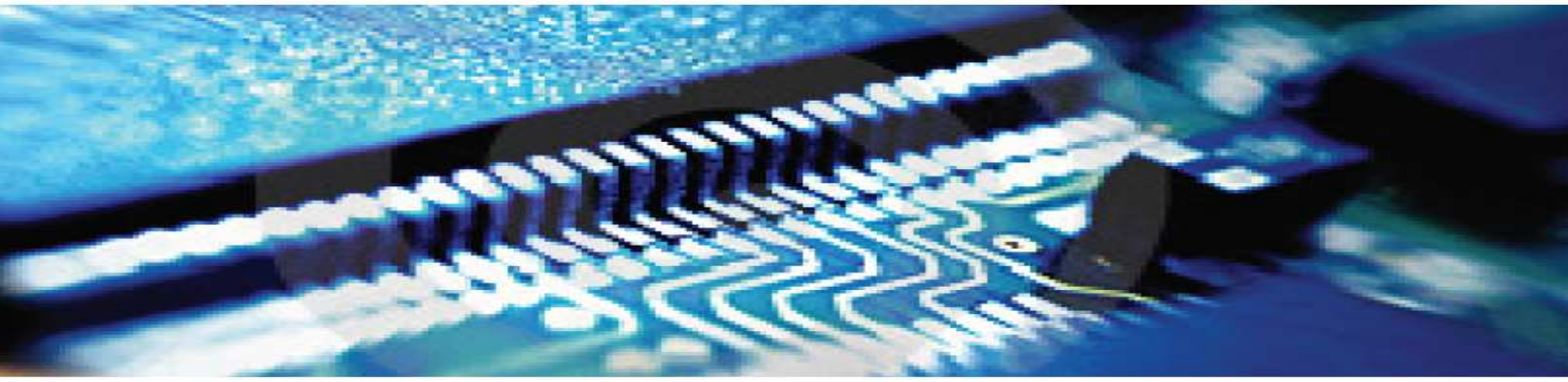


Image 7.9 ANALOG Tab

- **Analog Gain** : set gain value.
- **Analog Offset** : set offset value.



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